

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-48. (Canceled)

49. (Original) A polymer brush for binding a molecule in an aqueous sample in an assay, the brush comprising a substrate surface, a hydrophobic layer comprising hydrophobic polymer chain segments attached to the substrate surface and having a dry thickness of at least about 50 angstroms, and a hydrophilic layer attached to the hydrophobic layer containing functional groups for the attachment of a probe for binding the molecule.

50. (Original) The polymer brush of claim 49 wherein the hydrophobic layer has a dry thickness of at least about 100 angstroms.

51. (Original) The polymer brush of claim 49 wherein the hydrophobic layer has a dry thickness of at least about 1000 angstroms.

52. (Original) The polymer brush of claim 49 wherein the hydrophobic layer has a dry thickness of at least about 2000 angstroms.

53. (Original) The polymer brush of claim 49 wherein said hydrophobic polymer chain segments comprise repeat units derived from a hydrophobic monomer having a log P value of at least about 1.

54. (Currently Amended) The polymer brush of claim 49 wherein, in addition to said hydrophobic polymer chain segments, spacer molecules are also attached to the

substrate surface, the ratio of said hydrophobic polymer chain segments to the sum of hydrophobic polymer chains segments and spacer molecules ranging from about 0.2:1 to about 0.8:1.

55. (Original) The polymer brush of claim 49 wherein at least a portion of the hydrophobic polymer chain segments are crosslinked to other hydrophobic polymer chain segments in the hydrophobic layer.

56. (Original) The polymer brush of claim 49 wherein the hydrophilic layer comprises water-soluble or water-dispersible polymer chain segments having groups for the attachment of a probe, wherein an end of each segment is attached to the hydrophobic layer, and further wherein said water-soluble or water-dispersible segments have a weight average molecular weight of at least 1,000.

57. (Original) The polymer brush of claim 56 wherein the water-soluble or water-dispersible segments have a weight average molecular weight of at least 1,000 but no more than 5,000,000.

58. (Original) The polymer brush of claim 49 wherein the hydrophilic layer comprises water-soluble or water-dispersible polymer chain segments having groups for the attachment of a probe, said segments comprising repeat units derived from a water-soluble or water-dispersible monomer having a log P value of less than about 1.

59. (Original) The polymer brush of claim 49 wherein the hydrophilic layer comprises water-soluble or water-dispersible polymer chain segments having groups for the attachment of a probe, said segments comprising repeat units derived from a water-soluble or water-dispersible monomer having a log P value of less than about 0.1.

60. (Original) The polymer brush of claim 58 wherein in an absolute difference between a log P value of the hydrophobic monomers and the water-soluble or water-dispersible monomers is at least about 1.

61. (Original) The polymer brush of claim 58 wherein in an absolute difference between a log P value of the hydrophobic monomers and the water-soluble or water-dispersible monomers is at least about 2.

62. (Original) The polymer brush of claim 49 wherein the hydrophobic layer comprises hydrophobic polymer chain segments, one end of each of said hydrophobic segments being attached to the substrate surface, and further wherein the hydrophilic layer comprises water-soluble or water-dispersible polymer chain segments having groups for the attachment of a probe, one end of each of said water-soluble or water-dispersible segments being attached to the hydrophobic layer, the ratio of water-soluble or water-dispersible segments to hydrophobic segments being less than about 1:1.

63. (Canceled)

64. (Original) The polymer brush of claim 49 wherein the hydrophilic layer has a dry thickness ranging from about 10 angstroms to about 2000 angstroms.

65. (Original) The polymer brush of claim 49 additionally comprising a probe attached to the functional groups for binding the molecule.

66. (Original) The polymer brush of claim 65 wherein said groups for the attachment of a probe are capable of attaching said probe without first being subjected to a chemical treatment to activate said groups for probe attachment.

67. (Original) The polymer brush of claim 65 wherein the molecule is a biological molecule and the probe is selected from the group consisting of nucleic acids, polypeptides, peptide nucleic acids, markers, cells, elastin, collagen, carbohydrates, enzymes, lipids, phospholipids, hormones, drug targets, phosphates, and metal ions.

68. (Original) The polymer brush of claim 65 wherein said functionalized groups are selected from the group consisting of hydroxy groups, amino groups, carboxylic acids, carboxylic acid derivatives, and thiols.

69. (Previously Presented) The polymer brush of claim 49 wherein the hydrophilic layer is substantially free of crosslinks.

70-101. (Canceled)

102. (Currently Amended) A polymer brush for binding a molecule in an aqueous sample in an assay, the brush ~~comprises~~ comprising a substrate surface having a polymer layer thereon, said polymer layer comprising a first hydrophobic layer attached to the substrate surface, and a second hydrophilic layer attached to the hydrophobic layer containing groups for the attachment of a probe for binding the molecule, said brush being characterized in that said hydrophobic polymer layer has a minimum thickness such that, upon being immersed in a 10 mmolar sodium hydroxide solution for about 15 minutes, the polymer layer thickness is reduced by less than about 40%.

103. (Original) The polymer brush of claim 102 wherein the polymer layer thickness is reduced by less than about 20%.

104. (Original) The polymer brush of claim 102 wherein the polymer layer thickness is reduced by less than about 10%.

105. (Original) The polymer brush of claim 102 wherein the hydrophobic layer has a dry thickness of at least about 100 angstroms.

106. (Original) The polymer brush of claim 102 wherein the hydrophobic layer has a dry thickness of at least about 1000 angstroms.

107. (Original) The polymer brush of claim 102 wherein the hydrophilic layer has a dry thickness ranging from about 10 angstroms to about 2000 angstroms.

108. (Original) The polymer brush of claim 102 wherein the hydrophilic layer comprises water-soluble or water-dispersible intermediate segments having a weight average molecular weight of at least about 1000, and one or more functional groups capable of reacting with a probe selective for the molecule.

109. (Original) The polymer brush of claim 108 wherein said functionalized groups are selected from the group consisting of hydroxy groups, amino groups, carboxylic acids, carboxylic acid derivatives, and thiols.

110. (Original) The polymer brush of claim 109 wherein the molecule is a biological molecule and the probe is selected from the group consisting of nucleic acids, polypeptides, peptide nucleic acids, markers, cells, elastin, collagen, carbohydrates, enzymes, lipids, phospholipids, hormones, drug targets, phosphates, and metal ions.

111. (New) The polymer brush of claim 49 wherein the hydrophobic polymer chain segments are covalently bound to the substrate surface.

112. (New) The polymer brush of claim 111 wherein the hydrophilic layer comprises water-soluble or water-dispersible polymer chain segments, and further wherein an end of each of said hydrophilic polymer chain segments is covalently bound to a hydrophobic polymer chain segment.

113. (New) The polymer brush of claim 102 wherein the hydrophobic layer comprises hydrophobic polymer chain segments, and further wherein said polymer chain segments are covalently bound to the substrate surface.

114. (New) The polymer brush of claim 113 wherein the hydrophilic layer comprises water-soluble or water-dispersible polymer chain segments, and further wherein an end of each of said hydrophilic polymer chain segments is covalently bound to a hydrophobic polymer chain segment.